

**UNITED STATES DEPARTMENT OF COMMERCE****Patent and Trademark Office**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/254,118	05/19/99	TATSUMI	K 52433/544

EDWARD W GREASON
KENYON & KENYON
ONE BROADWAY
NEW YORK NY 10004

MMCR/1022

 EXAMINER

CHAMELISS, A

 ART UNIT PAPER NUMBER

2814

DATE MAILED: 10/22/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)
	09/254,118	TATSUMI ET AL.
Examiner	Art Unit	
Alonzo Chambliss	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 10 August 2001.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-9 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-9 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). _____.
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)
 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) Other:

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-9 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
4. In claims 1-3, the phrase "small balls" is vague and indefinite since it is not clear how the balls can be "small" when there is not another element or ball to compare them to.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Okuyama (JP 5-129374).

With respect to Claim 1, Okuyama teaches small balls 2 adhered at selected portions 8 of a substrate 7 for mounting semiconductor devices. The balls 2 are melted by the hot plate 12 thereby selectively plating the selected portions of the substrate 7 for electronic devices with a different metal (see English abstract and Figs. 1, 7, and 8).

With respect to Claim 2, the balls 2 are held on an arrangement base plate 1 having through holes 4 provided at positions corresponding to the portions 8 to be plated of the substrate 7 for electronic devices. The base plate 1 is transferred above the substrate 7 for mounting electronic devices. The balls 2 are provisionally adhered and held by the through holes 4 to the portions 8 to be plated (see Figs. 1, 7, and 8).

With respect to Claim 3, in the provisionally arranging and holding procedure, excess balls 2 are adhered to the arrangement base plate 1 are removed by applying vibrations from the suction of the arrangement base plate 1, thereby provisionally arranging and holding the balls 2 (see Figs. 1, 7, and 8).

With respect to Claim 4, it is inherent that the arrangement base plate 1 taught by Okuyama has vibrations that are ultrasonic vibrations since a typical step of removing excess small balls is preformed by applying a vibration to the arrangement base plate utilizing an ultrasonic vibration.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 5, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuyama (JP 5-129374) as applied to claim 1 above, and further in view of Le Coz et al. (U.S. 5,762,258).

Okuyama discloses a solder ball melted by reflowing to selectively plate the selected portions 8 of the substrate electronic devices with a different metal (see English abstract and Figs. 1, 7, and 8), but fails to specifically discloses ball made of tin. However, with respect to claim 5, Le Coz discloses a metal ball made of a combination of tin and lead (see col. 4 lines 15-17). Therefore, it would have been obvious design choice to use tin/lead solder for the material of the balls of Okuyama, since Okuyama discloses the balls comprise a solder material and tin/lead solder balls are known in the semiconductor packaging art of base plate attachment to be a good electrical conductor, as shown by Le Coz.

With respect to Claim 7 and 8, Le Coz discloses a substrate 51 for electronic devices is an insulating resin or a ceramic material and the selected portions are wiring composed of copper (see col. 1 lines 27-55). The balls 15 are held in holes 13 of base plate 11 which are connected to the copper wiring.

9. Claims 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuyama (JP 5-129374) as applied to claim 1 above, and further in view of Dunaway et al. (U.S. 4,980,240).

Okuyama fails to disclose balls made of gold and the substrate for the electronic devices is a lead frame composed of copper with the leads of the lead frame are partially plated. However, with respect to Claim 6 and 9, Dunaway discloses balls 80 made of gold and the substrate for the electronic devices is a lead frame composed of copper with the leads 76 of the lead frame are partially plated (see col. 5 lines 49-61 and col. 6 lines 5-20). Therefore, it would have been obvious to one of ordinary skill in the art to use a plated lead with Okuyama, since the balls can be attached to a lead frame and a plated lead would have added the benefit of the plating material for adhesion to the ball, and forming a good electrical connection, as shown by Dunaway.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. It is cited primarily to show processes of packaging a semiconductor device, which are similar to the process of the instant invention.

Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for this Group is (703) 308-7722 or 7724. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956.



Alonzo Chambliss
Supervisory Patent Examiner
Technology Center 2823



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